2008 Northern Marianas College Combined Research and Extension Plan of Work

I. Plan Overview

1. Brief Summary about Plan Of Work

With 26 years of existence in the Commonwealth of the Northern Mariana Islands (CNMI), the Northern Marianas College- Cooperative Research Extension and Education Service (NMC-CREES) is still adhering to its land-grant roots of teaching, research and extension while concurrently transforming into an interdisciplinary unit that is attracting a larger and more diverse group of clients. This 5-year Plan of Work is a cohesive vision for our preferred future in agricultural research and extension, and family and consumer sciences. The (ARE) Agricultural Research and Extension focuses on Aquaculture Development, Crop Improvement, Plant Protection, Soil and Water Quality, and Livestock Improvement. On the other hand, Family Consumer Sciences (FCS) focuses on Food Safety and Quality, Expanded Food and Nutrition Education Program (EFNEF), Nutrition Diet and Health, Community Development and Resource Management. The knowledge areas were selected for their significant potential for establishing mutually beneficial partnership with farmers, ranchers, homemakers, advisory councils, industry, and government agencies. With the current economic downturn, increase in population, increase pressure to natural resources, and food security issuess, this plan recognizes that NMC-CREES must be positioned to respond rapidly and effectively to emerging issues that affect the profitability and sustainability of the CNMI agriculture, now and in the years ahead.

This plan has grown out of discussions and listening sessions from people around the CNMI and emanated from reviews of the national goals of the United States Department of Agriculture (USDA), the needs of the commonwealth, faculty expertise and interest. Combining agricultural research and extension, and family consumer science into one unit will facilitate and strengthen this research-extension-client interaction to better focus the efforts of our scientists on high priority research problems and improve the level of technical competence of the extension staff. The CREES portfolio is strengthened through partnerships and collaboration with other land grant colleges and universities, as well as with stakeholders throughout the CNMI and the region. Our interactions with collaborators enables us to promote educational programs, extension services and our research projects that are the results of the growing needs and challenges that the CNMI community faces and must satisfy in order to improve the standard of living for its residents.

The mission of the NMC-CREES is committed to enhancing the well-being and quality of life of the CNMI community through research and extension in agriculture, family and consumer science.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2008	16.0	0.0	11.0	0.0
2009	22.0	0.0	12.0	0.0
2010	28.0	0.0	12.0	0.0
2011	28.0	0.0	12.0	0.0
2012	29.0	0.0	12.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Expert Peer Review
- Other (Program Leaders and Stakeholders representative)

2. Brief Explanation

Since the number of CREES staff is relatively small, all non-instructional faculty are encouraged to participate in the Merit Peer Review. Also, external collaborators from other universities may send their comments before the Peer Review. A draft of the proposal to be reviewed is e-mailed to all of the CREES staff for suggestions and comments, well before the review meeting. The draft of the proposal is revised and made available to all of the staff for the merit or peer review. All available professional research and extension staff participates in the review. During the review, we assess 1) the priority of importance of the proposed project; 2) the relevance of the proposal; 3) the quality and scientific value of the proposed research or extension activities and 4) the opportunities for cooperation with others, and (5) available resources. The proposals are revised to incorporate the suggestions given during the merit review and approved by the Director and in some extent with the NMC President aapproval prior to submission.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned programs were based on input from stakeholder groups and/or local scientist who identified the most critical issues. They utilize and conduct a number of forums, client visitations, conferences and periodic meetings to solicit advice to discuss agricultural and family consumer science research and extension needs and priorities. More formal and objective methods of involving stake holders in the process of problem identification, estimation of problem significance, problem diagnosis, assessment of research and extension priorities, program and project planning, program implementation and program evaluation will be developed, implemented and explained in updates to this 5 year plan.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The planned programs for both research and extension aim to increase promotion in the grass-root levels via program visibility and outreach through provisions of professional experts such as language interpreter, agriculture scientist and extension specialist, both local and off-island. The program will apply surveys, comparison, and diverse methodologies using scientific approach (intrinsic and extrinsic factors) that will dictate priorities.

3. How will the planned programs describe the expected outcomes and impacts?

The planned programs developed specific outcomes that would occur over a period of 5 years through pre- and post evaluation (either short, medium and long term), changes in learning behavior, change in action and change in condition such as lifestyle, environmental improvement and positive economic impact.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

NMC-CREES research and extension activities have always involved multi-disciplinary/multi-state regional projects, due to our isolated physical location far from the US mainland. Partnership and collaboration plays a big role for project success. Together with program updates that provides avenues for feedback mechanisms such as e-mail, suggestion box, and improved and updated websites.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages their participation

- Survey of the general public
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Targeted invitation to traditional stakeholder groups

Brief explanation.

The above listed activities have been the most effective tool to generate stakeholders' input and participation based on history. It also covers a broad range of targeted audiences.

2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees

Brief explanation.

Individuals with experience relevant to NMC-CREES' mission, goals and objectives are selected to serve on Advisory Councils. Community leaders are represented as advisory groups and represent community issues and priorities.

2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with invited selected individuals from the general public
- Meeting with the general public (open meeting advertised to all)
- Meeting with traditional Stakeholder individuals
- Meeting with traditional Stakeholder groups

Brief explanation

The methods mentioned above are commonly used and are effective tools to generate pariticipation.

3. A statement of how the input will be considered

- To Set Priorities
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs

Brief explanation.

Groups and program leaders based their needs on extension and research priorities and emerging problems of the CNMI

V. Planned Program Table of Content

V(A). Planned Program (Summary)

1. Name of the Planned Program

CNMI Families, Youth and Communities Enrichment Program

2. Brief summary about Planned Program

The economy of the Commonwealth of the Northern Mariana Islands (CNMI) continues to decline with unemployment rate at its highest since 2002. Despite CNMI economic problems, its population continues to grow.

More people than ever are struggling to "make ends meet" and are looking for better ways to effectively manage their money and limited resources. The Community Resource Development Program aims to decrease with the CNMI community's reliance on outside sources for household goods via home canning/food preservation, container gardening, family financial management, arts and local handicrafts and sewing programs for families with limited resources.

NMC 4H/Youth Development Program will help youth develop life skills that will help them become productive and responsible adults. These life skills include developing positive self-concepts, establishing effective interpersonal relationships, and learning practical skills for life. The 4H Extension agents will serve as advisors and will monitor the loan recipients with their actual implementation and progress with their small business development.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 801 40% Individual and Family Resource Management
- 802 10% Human Development and Family Well-Being
- 806 50% Youth Development

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

CNMI revenue relies heavily on tourism and garment factories. Revenue generated from tourism fluctuated but still considered to be very low. The CNMI government has frozen many vacant positions and our lawmakers had passed resolution supporting the Governor's proposal to cut employees' salaries by 10%, which became effective on June 2006.

The limited number of adult volunteers and the lack of recreation facilities for CNMI youths are believed to have contributed to high numbers of juvenile delinquency. Some youths are not interested in after school programs, especially if activities are academic in nature. Many youths would rather spend time playing video games or watching television.
NMC-CREES, the University of Hawaii and the CNMI Department of Public Health Services conducted a survey during the summer of 2005 and reported that a child spends an average of 4 hours watching television a day.

The home canning and food preservation program will be combined with the container gardening program so that the home canning and food preservation programs will not be limited to those with farms and land. An increased knowledge of financial management information will also be found throughout the community via a community wide campaign on "developing a budget, budgeting your food stamps and smart shopping".

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Decreased reliance on outside sources for household items – i.e. more CNMI residents will be canning and preserving food for home consumption and sewing cloths their families. Increased community knowledge on issues related to financial management and hands-on training for developing skills in the art of making local handicrafts to be sold in gifts shops throughout the three most populated islands of the CNMI.

The number of 4H clubs in schools and villages in the CNMI will increase as well as the number of adult volunteers for the 4-H club leaders. Additional FTE's funding available.

2. Ultimate goal(s) of this Program

The ultimate goal is to improve the quality of life for all CNMI residents by understanding and addressing our immediate community needs as well as breaking the cycle of social problems often caused by a lack of knowledge and self-worth.

This program will also continue to promote the 4-H values of Head, Heart, Health, and Hands. It will further recruit and train the adult volunteers to work with our youths and help them become better citizens.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	5.0	0.0	0.0	0.0
2009	6.0	0.0	0.0	0.0
2010	7.0	0.0	0.0	0.0
2011	7.0	0.0	0.0	0.0
2012	7.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

The ultimate goal is to improve the quality of life for all CNMI residents by understanding and addressing our immediate community needs as well as breaking the cycle of social problems often caused by a lack of knowledge and self-worth.

This program will also continue to promote the 4-H values of Head, Heart, Health, and Hands. It will further recruit and train the adult volunteers to work with our youths and help them become better citizens.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Demonstrations • Other 1 (Village Meetings) • Other 2 (Afterschool Activities) • Workshop • Education Class	• Newsletters • TV Media Programs • Web sites • Public Service Announcement

3. Description of targeted audience

Kids (6-7)
Youth (8-17)
Youth Leaders (18-21)
Adult Volunteers for Leaders
Economically Disadvantaged
Senior Citizens (Man Am'ko)
Caregivers for the elderly
General Public

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	200	1000	1000	3000
2009	350	1500	2000	4000
2010	400	2000	3000	5000
2011	500	2000	3000	5000
2012	500	2000	3000	5000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	0	0
2009	0	0
2010	0	0
2011	0	0
2012	0	0

V(H). State Defined Outputs

1. Output Target

- Number of Youth and Adults completing Money Management and Family Financial Management workshops.

2008 : 150 **2009 :** 200 **2010 :** 200 **2011 :** 200 **2012 :** 300

- Number of 4-H Clubs established in the CNMI

2008 : 4 **2009 :** 5 **2010 :** 6 **2011 :** 7 **2012 :** 7

- Number of established Entrepreneurs projects

2008 : 6 **2009 :** 6 **2010 :** 8 **2011 :** 8 **2012 :** 10

V(I). State Defined Outcome

1. Outcome Target

Number of participants completed workshop and training on home canning and food preservations.

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 100 **2009 :** 150 **2010 :** 200 **2011 :** 200 **2012 :** 200

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

1. Outcome Target

Number of participants applying knowledge gained. (Home canning and food preservation)

2. Outcome Type : Change in Action Outcome Measure

2008 : 50 **2009 :** 75 **2010 :** 100 **2011 :** 100 **2012 :** 150

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

1. Outcome Target

Number of youths and adults successfully completing the Sewing for Beginners on the islands of Saipan, Tinian and Rota.

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 150 **2009 :** 175 **2010 :** 200 **2011 :** 200 **2012 :** 200

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

1. Outcome Target

Number of youth and adults applying knowledge gained and sewing for their families.

2. Outcome Type : Change in Condition Outcome Measure

2008 : 75 **2009 :** 100 **2010 :** 100 **2011 :** 150 **2012 :** 150

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

1. Outcome Target

Number of youths and adults completing workshops on Youth and Adult Money Management.

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
150	200	250	300	300

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

1. Outcome Target

Number of youths and adults applying knowledge gained.

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
75	100	125	150	150

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

1. Outcome Target

Number of Adult Volunteers Recruited.

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	15	20	25	25

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

1. Outcome Target

Number of Youth Participating in the 4H/Youth Development Program

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
2500	3000	4000	5000	5000

3. Associated Knowledge Area(s)

- 806 - Youth Development

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Competing Public priorities
- Natural Disasters (drought,weather extremes,etc.)

Description

Natural disasters such as typhoons, flooding, drought and other extreme weather conditions and extreme economic downturn which might affect manpower availability; excessive turnover of technical staff involved in this program; and unavailability of needed facilities and equipment to conduct research

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Other (ES 237)
- Before-After (before and after program)

Description

Program evaluation will be done before and after the activity. Mostly after youth activities.

2. Data Collection Methods

- Observation
- On-Site
- Other (home visits,)

Description

Data collected on-site survey and program/project observation and also home visits.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Crop Improvement Program

2. Brief summary about Planned Program

The Crop Improvement program aims to increase the quality and quantity of produce grown in the CNMI. This will be accomplished through an integrated approach, utilizing information gained from locally inspired research projects, from which information can then be directly disseminated through extension activities. In an effort to improve farm productivity, sustainability, and competitiveness in the regional marketplace, this project aims to introduce appropriate technologies and improved plant genetic resources to the farming and gardening community. Tissue culture of economically important crops will be conducted such as banana, sweet potato, taro etc. to produce quality and disease free plants. Field trials and evaluations of new varieties in fruits, root crops and vegetables will be conducted in local soil and climatic conditions of CNMI.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 202 10% Plant Genetic Resources
- 204 40% Plant Product Quality and Utility (Preharvest)
- 205 50% Plant Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The People of the CNMI are highly dependent on imported foods. The great majority of produce sold in stores comes from Mexico, the U.S., China and other distant countries. In essence, farmers in the CNMI are competing with large-scale producers who are able to distribute produce consistently and in great volumes, over thousands of miles. Farmers in the CNMI have an opportunity to capture a certain fraction of these markets, not by matching the volume of produce imported from producers abroad, but by offering distributors, hotels and markets a better quality product that is fresher and tastier. Therefore, it is a priority of this program to identify improved genetic plant resources and materials and conducting variety trials to monitor their performance. By increasing the availability and quality of genetic plant materials that have been tried and tested here in the islands, farmers and gardeners should observe improved production, improved resistance to pathogens, and improved quality of their produce. Furthermore, it is a priority of this program to promote sustainable farming systems that improve the chances of farms achieving long-term success.

2. Scope of the Program

- In-State Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant or increase. Additional FTE will be available. More regional collaborations with other land grant colleges and universities as well as federal and local agencies

2. Ultimate goal(s) of this Program

To raise the quality and quantity of crops produce grown in the CNMI

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	2.0	0.0	1.0	0.0
2009	3.0	0.0	2.0	0.0
2010	3.0	0.0	2.0	0.0
2011	3.0	0.0	2.0	0.0
2012	3.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Tissue culture of economically important crops will be conducted such as banana, sweet potato, taro etc. to produce quality and disease free plants. Field trials and evaluations of new varieties in fruits, root crops and vegetables will be conducted in local soil and climatic conditions of CNMI. Research projects in the form of fruit and vegetable variety trials will be performed locally. Workshops will be conducted for farmers, extension agents, and students on fruit tree grafting, crop production and improvement along with other propagation techniques. Video production will be used whenever possible. Publications (brochures and fact sheets) and presentations will be produced and disseminated through informational seminars and lectures. Farmer-type gatherings such as association meetings, soil and water conservation district meetings and forums will be targeted. Students from the grade school, high school and college will also be involved in activities and presentations when ever possible. Implement best management practices on farms.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• One-on-One Intervention • Demonstrations • Group Discussion • Other 1 (Technical Presentations) • Education Class • Workshop	• Web sites • Newsletters • Public Service Announcement • Other 1 (Free Air Time)

3. Description of targeted audience

Government /Agency Collaborators
All farm crop producers and farm helpers in the CNMI
Business operators that promote or sell farm products
Grade school, High School and College students
Adult Volunteer Leaders (4-H Clubs)

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	500	100	500
2009	100	500	100	500
2010	100	500	100	500
2011	100	500	100	500
2012	100	500	100	500

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	2	0
2009	2	0
2010	1	0
2011	2	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

- Number of research projects completed on Crop Improvement Issues

2008 :2 **2009 :**2 **2010 :** 3 **2011 :**3 **2012 :**4

V(I). State Defined Outcome

1. Outcome Target

Number of households that begin to grow food in their own garden

2. Outcome Type : Change in Action Outcome Measure

2008 :10 **2009 :** 20 **2010 :** 20 **2011 :**30 **2012 :** 30

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

1. Outcome Target

Number of farmers that learn to use Organic agriculture production systems on farm

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
2	6	10	12	12

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

1. Outcome Target

Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc…

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
2	6	10	10	12

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Economy
- Natural Disasters (drought,weather extremes,etc.)

Description

The tropical islands of the Northern Marianas have year-round agricultural management problems that are heavily influenced by the climate. The economy is also heavily dependent on the Asian economy, and not the mainland USA economy; whatever happens in Asia is multiplied onto CNMI. New plagues of pest may be delivered by tropical storms and typhoons.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Time series (multiple points before and after program)

Description

A benchmark data on crop yield, objective assessment of the lower costs and higher output that will result from an improved crop production. This will require the preparation and up to date farm budgets for producing crops.

2. Data Collection Methods

- Observation
- On-Site

Description

Farms, Farmers and people within the community will be questioned, observed and documented before and after having implemented the said technologies.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Diet, Physical Activity, and Health

2. Brief summary about Planned Program

Diet, Physical Activity, and Health is a program that will use scientific evidence and best practices recommendations/models to bring about changes that are conducive to improved health at the population level. Policy and environmental approaches and interventions in relation to diet, physical activity, and health promotion are the main focus of this program.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 703 50% Nutrition Education and Behavior
- 724 50% Healthy Lifestyle

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

According to the World Health Organization the indigenous Chamorro and Carolinian populations within the CNMI have the third highest rate of Type II diabetes in the world per capita. Additionally, Atherosclerotic diseases is another leading cause of death. Obesity, a major risk factor for chronic diseases, is widespread among the adult population. Unhealthy diet, sedentary lifestyle, and tobacco use are major risk factors that contribute to the early onset and complication of the aforementioned diseases. Awareness of the underlying causes of chronic diseases are lacking in the CNMI. As a result of a lack of awareness, the majority of the population do not have the behavior-related knowledge needed to make lifestyle changes. While the majority of community efforts have been focused on diet, there is a demonstrated need to focus on the health benefits of physical activity. Currently, the CNMI lacks its' own dietary and physical activity guidelines. Uniform guidelines are needed for not only consistency of messages being propagated to the community, but to guide policy development as well. There is an urgent need for population-wide interventions in the areas of diet, physical activity, and health promotion (policy and environmental interventions).

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Diet, Physical Activity, and Health Promotion will work with various agencies and diverse stakeholders as well as with regional partners from Pacific institutions of higher learning and others who can contribute to bringing about healthier living. The program intends to use its policy and environmental intervention strategies to compliment the efforts of existing educational programs (EFNEP & FSNEP). We assume that more awareness of the burden of lifestyle disease will result in increased community action to curb the incidence of such diseases.

2. Ultimate goal(s) of this Program

This program seeks to bring about population-wide interventions that will result in an increase in positive

behaviors relating to diet and physical activity; thereby reducing the burden of lifestyle diseases.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.5	0.0	1.0	0.0
2009	2.0	0.0	1.0	0.0
2010	2.5	0.0	1.0	0.0
2011	2.5	0.0	1.0	0.0
2012	2.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

· Development of CNMI dietary guidelines
· Development of CNMI physical activity guidelines
· Social marketing/awareness campaign on the burden of non-communicable diseases/lifestyle diseases and role of diet and physical activity in NCD prevention
· Establishment of CNMI Non-Communicable Disease Control Task Force
· Development of Non-Communicable Disease Control Strategic Plan (guide for policy development and environmental strategies)

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Workshop • Group Discussion • One-on-One Intervention • Education Class • Demonstrations	• TV Media Programs • Other 1 (Culturally approp. brochures) • Public Service Announcement • Newsletters • Web sites • Billboards

3. Description of targeted audience

The target audience includes the general public, with a particular emphasis on areas of the islands that have a majority of its' residence at or below the poverty level. Taking into consideration social-economic status, educational attainment, and lifestyle (diet, physical activity, tobacco) the majority of the general population can be considered "at risk".

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	5000	100	1500
2009	125	6000	150	2000
2010	150	7000	150	2000
2011	175	7000	175	2000
2012	175	7000	175	2000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	0	0
2009	0	0
2010	0	0
2011	0	0
2012	0	0

V(H). State Defined Outputs

1. Output Target

- Diet, Physical Activity, and Health

2008 :2 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**2

V(I). State Defined Outcome

1. Outcome Target

Development of Physical Activity Social Marketing Campaign (PASMC)

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :1 **2009 :** 1 **2010 :** 1 **2011 :**1 **2012 :** 1

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Other (lack of collaboration)
- Natural Disasters (drought,weather extremes,etc.)
- Economy

Description

Although we have no control over the external factors mentioned, we will do our best to be efficient and effective in reaching our outcomes. Collaboration is a key component of reaching sour outcomes; this external factor is more concerned with interagency collaboration vis-a-vis internal collaboration.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- Other (process evaluation)

Description

· Pre and post evaluation

This will be incorporated into the PA questionnaire; it will be administered before and after the PA Social Marketing Campaign to assess the effectiveness of the campaign.

· Process evaluation

This will be used to gauge the NCD-related (Task Force and Strategic Plan creation). It will also be used to monitor policies conducive to improving health that have been created as a result of the NCD Strategic Plan.

2. Data Collection Methods

- Whole population
- Other (Population-based questionnaire)
- Observation

Description

A variety of methods will be used to collect data. The population questionnaire will be used to establish baseline data in the area of physical activity practices among adults. Observation will be used to assess whether there has been an increase in the utilization of the Beach Road Pathway and other areas of interest.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Livestock Improvement Program

2. Brief summary about Planned Program

The Livestock Improvement Program (LIP) is designed to improve the competitiveness of the CNMI cattle, goat, swine and poultry produced, by reducing costs of production, increasing productivity and profits. The program will improve the safety of animal products by assisting in the development of suitable slaughter facilities and meat inspections. The program will focus on eradicating livestock diseases of economic and public health importance. Through partnership and collaboration with other land grant colleges, local government agencies such as the Department of Land and Natural Resources (DLNR) and regional organization such as the Secretariat of the Pacific Community (SPC) and the Agricultural Development in the American Pacific (ADAP). It also aims to focus on offering new opportunities for alternative livestock enterprise such as duck, pigeon and rabbit production. Continued promotion and training of local paravets to assist CNMI Veterinarian for effective and high quality veterinary services. Research and extension emphasis on emerging CNMI Livestock industry will be strengthened. This will include improving animal products (before harvest), reproductive performance and alternative animal feed nutrition. Supplemental local feedstuff and sustainable pastured beef and poultry will be continuously promoted and will be adopted by farmers. Also under the LIP, the Aquaculture and Fisheries Development Program (AFDP) intends to enhance the economic profitability of its clients through the progressive transfer of knowledge and technology. Our promotion of the grow-out of Pacific White Shrimp (Litopenaeus vannamei), for example, has led to the development of a commercial shrimp production industry that meets the large demand for fresh, live shrimp in the CNMI's local market. Our success leads us to believe that there is further need to investigate other aquatic species for expansion in the aquaculture industry. For the duration of this POW the AFDP will attempt to further expand its existing aquatic selection through the introduction of rabbit fish, groupers, mullets, milkfish, and freshwater prawn through tank culture and continue support for farmers growing tilapia. Additionally, a pathogen exclusion and prevention program will be investigated and implemented to protect the industry from the potentially devastating effect of suspect pathogens.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 111 1% Conservation and Efficient Use of Water
- 301 10% Reproductive Performance of Animals
- 302 10% Nutrient Utilization in Animals
- 303 10% Genetic Improvement of Animals
- 307 20% Animal Management Systems
- 308 5% Improved Animal Products (Before Harvest)
- 311 20% Animal Diseases
- 312 5% External Parasites and Pests of Animals
- 313 5% Internal Parasites in Animals
- 314 5% Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals
- 315 2% Animal Welfare/Well-Being and Protection
- 722 5% Zoonotic Diseases and Parasites Affecting Humans
- 902 2% Administration of Projects and Programs

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Livestock industry is made up of 80% small-scale ranchers, meaning ranchers/farmers with limited resources, lack of technical knowledge and subsistence farmers. The high cost of feeds for swine and poultry discourages them from farming. Levels of cattle and goats productivity raised on poorly managed pasture are low. There are animal health problems such as Brucellosis, Collibacillosis and parasitism that affect productivity. Avian flu scares in the neighboring countries that prevent export. Inbreeding is a major problem due to a continual shortage of imported breeding males or new breeding stock. Only a small part of the locally produced beef and goat, or pork meat is inspected and receives USDA approval. Lack of USDA approved slaughterhouse facility.

The population of the CNMI, with the inclusion Asian guest workers and tourists, are traditionally large consumers of fish. With the decline of the fisheries in the oceans surrounding the CNMI, aquaculture is currently feasible on the islands. At present the CNMI is highly dependent on imported seafood from other markets. Producing or harvesting more fish locally, may lead to the improvement of the Commonwealth's economy; provide increased employment to local fishermen and farmers; and improve the supply, and quality of the seafood consumed locally. These are long- term issues in the CNMI.

2. Scope of the Program

- Integrated Research and Extension
- In-State Research
- In-State Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Additional FTE's for other islands (inclusion of Animal Nutritionist, Animal Scientist position, Aquaculture researcher and Extension agents)
Certification and licensing of Veterinarian and Paravets
Provision of slaughter house and meat inspector
Increase funding for animal health research and extension program
More Train the Trainer Program
Provision of small scale feed mill industry
Development of Alternative Livestock Enterprise
Increase research and extension collaboration with other Land Grant Universities, federal and local agencies for livestock and aquaculture
Funding will remain constant or increase.
Additional farms will be erected as a result of increased promotion of technology transfer and introduction of feasible aquatic culture.

2. Ultimate goal(s) of this Program

Improve the competitiveness of the CNMI cattle, goat, swine and poultry produced, by reducing cost of production and increasing productivity and profits.
To ensure viability of small scale farmers engaged in alternative livestock enterprise
To train more paravets/ animal health technician regarding animal health and production
To enhance economic profitability of aquaculture farmers
Reduced reliance on foreign seafood imports
Improve the health of the people of the CNMI
Further promote the CNMI's aquaculture industry
Lessen environmental impact on native species in surrounding waters

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	2.8	0.0	0.3	0.0
2009	2.8	0.0	0.3	0.0
2010	3.8	0.0	1.3	0.0
2011	3.8	0.0	1.3	0.0
2012	3.8	0.0	1.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

· Training of local Paravets-provision of animal health technicians
· Conduct Animal disease survey
· Implement animal health program -USDA
· Conduct farm training for small farmers- livestock enterprise and genetic upgrading, animal welfare, animal nutrition and husbandry management, etc
· Conduct animal health and management workshops
· Conduct mini-workshop on alternative livestock enterprise
· Implement and promote sustainable livestock waste management
· Educate community on zoonotic diseases such as Avian Flu, Brucellosis etc
· Grant writing for research funding
· Research production specifics of raising groupers, rabbit fish, mullets, milkfish, and freshwater prawns through inland, intensive, tank culture.
· Conduct workshops and demonstrations on the production of these aquatic species. Targeting existing farmers for further expansion as well as potential investment.
· Market analysis (economics) Tilapia-Green Production system
· Demonstration and promotion of aquaculture effluent management

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Other 1 (Mini Workshops) • One-on-One Intervention • Demonstrations • Other 2 (Presentations) • Education Class	• Public Service Announcement • Web sites • Other 1 (Video/Radio) • Newsletters • TV Media Programs

3. Description of targeted audience

Youth and adult
Ranchers/farmers
Livestock producers
Government agencies
Leaders
All aquaculture producers in the CNMI
Retirees looking at new investment
Entrepreneurs

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	250	600	300	500
2009	300	700	500	1000
2010	350	800	500	1500
2011	350	1000	500	1500
2012	400	1200	500	1500

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	1	1
2009	1	1
2010	1	1
2011	1	1
2012	1	1

V(H). State Defined Outputs

1. Output Target

- Number of Research/Demonstration projects on Animal Diseases, Animal genetic upgrading, and Animal science

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 3

- Number of Livestock Workshops (Production, Animal Health, etc.)

2008 : 6 **2009 :** 6 **2010 :** 8 **2011 :** 8 **2012 :** 8

- Number of Research Projects for Aquatic Species

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

- Numbers of new projects for paravets practicing hands-on in the CNMI

2008 : 2 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

- Number of aquaculture workshops

2008 : 4 **2009 :** 5 **2010 :** 6 **2011 :** 6 **2012 :** 8

- Number of workshops for ANimal Welfare.Well-being and Protection

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

V(I). State Defined Outcome

1. Outcome Target

Number of New Farmers engaged in Alternative Small Scale Livestock Enterprise

2. Outcome Type : Change in Action Outcome Measure

2008 : 5 **2009 :** 10 **2010 :** 10 **2011 :** 15 **2012 :** 15

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases
- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals
- 722 - Zoonotic Diseases and Parasites Affecting Humans

1. Outcome Target

Number of farmers used Artificial Insemination porgram (cattle, goats, and swine)

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	15	20	20	20

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 303 - Genetic Improvement of Animals
- 308 - Improved Animal Products (Before Harvest)

1. Outcome Target

Numbers of farmers market their produce (egg/meat)

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	10	10	10	10

3. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)

1. Outcome Target

Number of Farmers who adapted the sustainable livestock waste managements

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
5	5	5	6	6

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 307 - Animal Management Systems

1. Outcome Target

Number of farmers learning how to venture new aquatic species

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	10	10	10	10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

Number of clients receiving animal health services thru consultations

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	20	20	20	20

3. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals
- 722 - Zoonotic Diseases and Parasites Affecting Humans

1. Outcome Target

Number of clients adapted the animal waste management and learned to conserve water

2. Outcome Type : Change in Action Outcome Measure

2008 : 10	**2009 :** 10	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 307 - Animal Management Systems

1. Outcome Target

Number of farmers who becomes aware about animal welfare and protection from workshops

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 10	**2009 :** 10	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 315 - Animal Welfare/Well-Being and Protection

1. Outcome Target

Number of farmers improved animal productivity thru improved pasture/rotation grazing

2. Outcome Type : Change in Condition Outcome Measure

2008 : 5	**2009 :** 10	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 308 - Improved Animal Products (Before Harvest)

1. Outcome Target

Number of proposal submitted for funding for animal nutrient utilization, animal production and animal health

2. Outcome Type : Change in Action Outcome Measure

2008 : 1	**2009 :** 1	**2010 :** 1	**2011 :** 1	**2012 :** 1

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 902 - Administration of Projects and Programs

1. Outcome Target

Numbers of farmers learning from program

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5	**2009 :** 5	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 303 - Genetic Improvement of Animals

1. Outcome Target

Number of farmers learning about small scale alternative livestock enterprise

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	15	15	20	20

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

Numbers of farmers become aware of economic and public health diseases of livestock animals (swine,poultry, cattle, goat etc.)

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
50	50	50	100	100

3. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals
- 722 - Zoonotic Diseases and Parasites Affecting Humans

1. Outcome Target

Number of youths learning animal management system and animal welfare and protection

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
5	5	10	10	10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection

1. Outcome Target

Number of farmers become aware of toxic weeds and poisonous plants in the CNMI

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
50	50	50	50	50

3. Associated Knowledge Area(s)

- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals

1. Outcome Target

Number of farmers who venture to another livestock business because of success in previous farming

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
3	3	3	3	3

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)

1. Outcome Target

Number of farmers who learned to formulate local feeds stuff as feed supplement

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
3	5	5	5	5

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals

1. Outcome Target

Number of farmers who regularly dewormed their animals for ecto and endoparasitism

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
20	20	20	20	20

3. Associated Knowledge Area(s)

- 312 - External Parasites and Pests of Animals
- 313 - Internal Parasites in Animals

1. Outcome Target

Number of farmers learning different types of potential aquatic specise for business

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
5	10	10	10	10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Appropriations changes
- Competing Programatic Challenges
- Public Policy changes
- Other (Cultural)
- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Government Regulations

Description

Presence of disaster, temperature change, availability of resources both local and federal appropriations, political status and goverment regulations may affect programs.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Other (Questionnaire/survey, evaluation)
- Time series (multiple points before and after program)
- During (during program)
- Before-After (before and after program)

Description

Animal performance, as well as the best management practices utlized or tested will be monitored before and after and during the program for both control and treatment tests. Results will be analyzed and compared with basal data. Data's are gathered thru observation, laboratory tests and sampling.

2. Data Collection Methods

- Sampling
- Whole population
- Telephone
- Unstructured
- Tests
- On-Site
- Observation

Description

Data will be gathered throughout the entire population affected by the disease thru sampling representative or specimen as part of the subject for experiment or research test. Additional inputs maybe taken via telephone as part of the behavioral results from client observations and analysis (based on animal performance, environment effect and economic feasibility).

Each aquatic species will be monitored for production rates and their differences in profit margin. Daily water quality analyses of water quality parameters are essential to ensure that environmental conditions are optimal for the culture species. Weekly growth sampling will be conducted for feed management purposes. Quarterly sampling for disease surveillance purposes is recommended.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Protection Program

2. Brief summary about Planned Program

The islands in the Commonwealth of the Northern Mariana Islands (CNMI), relatively isolated from large landmasses, had evolved into an ecological system that is unique to the islands, and their biota had reached the so-called ecological balance. These islands systems are extremely fragile and vulnerable to the impacts of invasive species; therefore, any intrusion of alien species could be very devastating to the ecological balance. Ironically, technological development of the transportation system has brought these islands conceptually close to and easily accessible from large landmasses, from which biota from these large landmasses can be transported to the islands. There are already present in the CNMI numerous of these alien species (invasive species) that are seriously impacting agriculture development. Our combined research and extension efforts are aimed at enhancing traditional agricultural practices, developing complementary methods of best management practices, and adopting already proven methods of addressing invasive species. Our program will attempt to catalog the pernicious invasive species that have already reached these islands and any future arrivals. In addition, we will develop reference collections of invasive species and general entomological specimens for educational purposes. We will continue to collaborate with regional expertise to develop systems to contain or to minimize the deleterious impacts of these invasive species on agriculture. We will continue to monitor ports of entries for early detection of invading unwanted plants and animals from without the CNMI. Our biological control program will enhance production of beneficial organisms that will be utilized by our integrated pest management program to minimize the need for pesticides. Early detection of crop pests and diseases is important to prevent the build up of pest populations and the spread of diseases. Our early detection and identification of insects, mites and other arthropods, plant pathogens, weeds, vertebrates, mollusks and other pests affecting plants will enhance our integrated plant protection programs and will result in preventing crop damage of epidemic proportion.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 211 40% Insects, Mites, and Other Arthropods Affecting Plants
- 212 5% Pathogens and Nematodes Affecting Plants
- 213 10% Weeds Affecting Plants
- 214 5% Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 20% Biological Control of Pests Affecting Plants
- 216 20% Integrated Pest Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The CNMI has very limited agricultural resources. Most agricultural productions are at subsistence level and any threat to these resources can seriously affect the livelihood of the CNMI community and economy. Invasive species of both plants and animals pose the most serious threat to our meager resources and would, therefore, hinder sustainable agriculture development in the CNMI. There are already fairly large numbers of invasive species in the CNMI. These must be controlled or eradicated. Their impacts and damages to crops must be minimized or eliminated. We will strive to increase our capability to address the problems of invasive species, to improve best management methods and

to extend these methods to our fulltime and subsistence farmers and other stakeholders.

2. Scope of the Program

- In-State Research
- In-State Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We assume funding will remain constant or increase and additional FTE's will be available. External funding source will be secured. Farmers and other stakeholders will have sufficient information on invasive species and to understand the relationship between invasive species and agriculture production. Farmers, with assistance from research and extension staff of NMC-CREES, will be able to minimize the impacts and damages invasive to their crops, and therefore their crop production will increase. The deleterious effects of invasive species can be curtailed or minimized. Invasive species can be controlled and some can be eradicated.

2. Ultimate goal(s) of this Program

The ultimate goals of our program are: 1) to minimize or curtail the deleterious impacts of invasive species on agricultural crops, 2) to control or eradicate invasive species.3) strive for development of sustainable agriculture.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	3.3	0.0	4.3	0.0
2009	3.3	0.0	4.3	0.0
2010	4.3	0.0	5.3	0.0
2011	4.3	0.0	5.3	0.0
2012	4.3	0.0	5.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Our program staff will conduct research on biological and other methods of control against invasive weeds, insect pests, mollusks and plant diseases. As an example, the weed, Coccinia grandis, which came to the island of Saipan in the 1980's, has since spread throughout the island and recently found its way to the islands of Tinian and Rota. On Saipan, this invasive species has inundated even the forest areas climbing and covering all types of vegetation, including indigenous plants. In Hawaii, this invasive species is controlled by two species of beetles (Acythopeus coccinae and A. burkhartorum) and a species of moth (Mellitia oedipus). We aim to continue research on this weed and its parasites. Another example is the recently introduced Cuban slug, Veronicella cubensis, into the CNMI. It has become established on the island of Rota, has multiplied and has spread throughout most of the farm areas causing extensive damage to many crops. It has become a major agriculture pest and it has also become a threat to other islands in the CNMI where this pest is not present. We intend to continue to apply the best management methods of control and to find its natural enemies to supplement other methods of control. There are many more existing weeds, arthropods and other crop pests and diseases that require continuous application of best management methods. We will continue to improve on these methods and to extend the knowledge to our stakeholders. We will also continue to collect arthropods of economic importance, expand and enhance the economic insect collection, and the general invertebrate collection for reference, for taxonomic studies, and for educational purposes.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Demonstrations • One-on-One Intervention • Workshop • Group Discussion • Other 1 (presentation) • Education Class	• Public Service Announcement • Newsletters • Web sites • Other 1 (Free Air Time) • TV Media Programs

3. Description of targeted audience

Farmers, other crop producers and farm helpers
Business operators that promote or sell farm products
Grade schools, high schools and college students interested in further knowledge in agriculture
Adult Volunteer Leaders (4-H Clubs)

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	500	1000	500	1000
2009	500	1000	500	1000
2010	500	1000	500	1000
2011	500	1000	500	1000
2012	500	1000	500	1000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	1	0
2009	1	0
2010	1	0
2011	1	0
2012	1	0

V(H). State Defined Outputs

1. Output Target

- Number of Research Projects completed on Invasive Species such as scarlet guard, melon fly, papaya mealy bug, and Cuban slug)

2008 : 1 **2009 :** 2 **2010 :** 2 **2011 :** 1 **2012 :** 1

V(I). State Defined Outcome

1. Outcome Target

Number of farmers learning biological control methods against invasive species

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 15 **2009 :** 20 **2010 :** 30 **2011 :** 30 **2012 :** 30

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers using biological control against invasive species

2. Outcome Type : Change in Action Outcome Measure

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers learning Integrated Pest Management for suppression of invasive species and reduction of damage they cause

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 15 **2009 :** 20 **2010 :** 30 **2011 :** 30 **2012 :** 30

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants

- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers using Integrated Pest Management to control invasive species

2. Outcome Type : Change in Action Outcome Measure

2008 : 2	**2009 :** 2	**2010 :** 3	**2011 :** 3	**2012 :** 3

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Decrease the population of the various invasive species (Cuban Slug; Melon Fly; Sweet potato Weevil; Whiteflies infestation) by certain percentage:

2. Outcome Type : Change in Condition Outcome Measure

2008 : 20	**2009 :** 30	**2010 :** 30	**2011 :** 30	**2012 :** 30

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

1. Outcome Target

Number of farmers learning the identity of invasive species through the use of the invasive species or economic insect reference collection

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 10	**2009 :** 20	**2010 :** 20	**2011 :** 20	**2012 :** 20

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

1. Outcome Target

Number of farmers able to identify some of the invasive species causing damage to their farm crops

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
2	4	4	4	4

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

1. Outcome Target

Number of farmers learning best practice management to control or eradicate the Cuban Slug, Veronicella cubensis

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
10	15	20	20	20

3. Associated Knowledge Area(s)

- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

1. Outcome Target

Number of farmers implementing best practice management to control or eradicate the Cuban Slug, Veronicella cubensi

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
5	10	10	10	10

3. Associated Knowledge Area(s)

- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers implementing best practice management to control or eradicate the Cuban Slug, Veronicella cubensi

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
20	30	30	30	0

3. Associated Knowledge Area(s)

- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers learning methods of early detection of crop pests and diseases on their farms

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
10	20	30	30	30

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Number of farmers using methods of early detection of crop pests and diseases on their farms

2. Outcome Type : Change in Action Outcome Measure

2008 : 2	**2009 :** 2	**2010 :** 3	**2011 :** 3	**2012 :** 3

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

1. Outcome Target

Numbers of farmers attending workshops, demonstration, and presentation on invasive species

2. Outcome Type : Change in Condition Outcome Measure

2008 : 10	**2009 :** 20	**2010 :** 30	**2011 :** 30	**2012 :** 30

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Other (competing public priorities)
- Competing Public priorities
- Natural Disasters (drought,weather extremes,etc.)

Description

The Mariana Islands Archipelago, which includes the islands in the CNMI, lies in the path of tropical storms and typhoons, which are usually generated from east or south east of the archipelago. Several storms or typhoons pass the CNMI practically every year, some of which become super typhoons generating wind velocity as strong as 200 miles per hour. A number of these typhoons can inflict total damage to agricultural crops and various private and public facilities. These conditions definitely affect the outcomes of our programs.

The recent change in the World Trade Marked has drastically impacted the local economy, particularly in the garment industry.

During the past few years, many garment manufacturers in the CNMI have closed down due to increased competition by foreign countries importing garments into the United States. Local government revenue consequently has substantially decreased. In addition, the two major airlines (Continental and Japan airlines) bringing tourists to the islands have drastically decreased their flights into the CNMI, which further decreased government revenue. These turn of events are reflected in the dismal economic conditions of the CNMI presently.

As a result of the substantial decrease in government revenue, the local government has shifted its priorities. Unfortunately, agriculture development is not considered one of the priorities of the government.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Time series (multiple points before and after program)

Description

Invasive species will be monitored at various intervals before and after implementation of biological control methods, and or comprehensive integrated or best management practices. Insects and other arthropods entering the CNMI through air and ocean vessels on their cargoes and passengers will be monitored in collaboration with Agriculture Quarantine.Agriculture pest surveys, which were initiated in July 2006, will continue to monitor existing pests and will detect newly introduced invasive species through samplings, observations and survey questionnaires.

2. Data Collection Methods

- Sampling
- On-Site
- Observation

Description

Sampling

Five sites on each island (Saipan, Rota, and Tinian) will be selected to periodically collect specimens for detection and identification of invasive species. Information on species collected will be recorded and tabulated for further analysis.

Survey questionnaire

Form questionnaire will be developed and distributed to farmers to ascertain what invasive species they have noticed on their crops. Information will be collected and tabulated. If pests are reported active, Extension Agents will be dispatched to the affected farms to make recommendations on management and control of target pests.

Observation

Periodic visits will be made to various farms to observe farm activities, note type of crops planted and observe the conditions of crops.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Soil and Water Quality Program

2. Brief summary about Planned Program

The Soil and Water Management program will promote the wise conservation, management and sustainable development of Soil and Water Resources here in the CNMI. This program aims to decrease the community's reliance on municipal water wells by promoting the use of rain catchments system. There is also a strong need to introduce and test appropriate technologies or best management practices for soil strengthening and conditioning to further reduce the need for water consumption on the farm. Furthermore, it is envisioned that these practices will improve the economics and competitiveness of the farming systems here by utilizing organic materials available here on island whenever possible, further decreasing the reliance on imported fertilizers, pesticides and feeds. This program also aims to educate the people of the CNMI on the value of aluminum recycling through capacity building and education

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 102 20% Soil, Plant, Water, Nutrient Relationships
- 111 50% Conservation and Efficient Use of Water
- 403 30% Waste Disposal, Recycling, and Reuse

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The People of the CNMI are highly dependent on imported goods. The high cost of shipping relative to the enormous distance between the Marianas Islands and the U.S. Mainland has had an adverse impact on the price of all commodities brought to the island. The high cost of living in the islands is especially discomforting in respect to the rising cost of operating a farm. The high cost of feeds and fertilizers, for example, have had a detrimental effect on the ability of the indigenous people to sustain their farming endeavors. Furthermore, the islands' have observed a continuous and steady decline of available land, water and soil resources. Due to the geographic nature of the islands, soils here are either highly erodible or porous requiring extra effort in protecting soil and water resources from overuse, potential contamination or total loss. This is especially significant when you consider the high frequency of heavy rains and typhoons. Priority will be given to promoting sustainable agriculture techniques that protect and nurture soil and water resources such as cover cropping, dry litter waste management system for hogs, no-till farming, mulchings, composting and organic farming in general. This program aims to focus mainly on promoting simple best management practices for conserving and developing the islands soil and water resources to ensure that they may be available and healthy for many generations to come.

2. Scope of the Program

- Integrated Research and Extension
- In-State Research
- Multistate Integrated Research and Extension
- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Funding will remain constant or increase. External funding source will be secured for projects that are significance to CNMI. Soil and water conservation efforts will increase over time as more and more farmers and members of the community adopt the said activities on their own. Additional FTE's will be available

2. Ultimate goal(s) of this Program

The Soil and Water Management program will promote the wise conservation, and management and sustainable development of Soil and Water Resources here in the CNMI. Furthermore, it is the ultimate goal of this program to reduce the demand for imported food commodities, as farmers are better able to supply these commodities with improved soil and water quality.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.0	0.0	1.0	0.0
2009	1.0	0.0	1.0	0.0
2010	2.0	0.0	2.0	0.0
2011	2.0	0.0	2.0	0.0
2012	2.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Demonstration/research projects will be introduced as learning tools. The Dry Litter Waste Management system demonstration along with composting demonstration will be continued and documented. To maximize the exposure of the demonstrations themselves, an educational video series will be produced. Efforts will be made to either receive free or purchase airtime on the local cable T.V. station to maximize viewer exposure to the educational video series. Furthermore, a goal of this program will be to supply video rental stores will these educational videos for increased viewer numbers. Still photography will also be used to document research and demonstration projects for use in publications (brochures and fact sheets) and presentations to be produced and disseminated through informational seminars and lectures. Farmer-type gatherings such as association meetings, soil and water conservation district meetings and forums will be targeted. Students from the grade school, high school and college will also be involved in activities and presentations when ever possible. Soil sampling for farmers will be ongoing. As a pollution prevention activity, recycling will be promoted and encouraged through capacity building, outreach and education.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (Presentation, Field Days) • Demonstrations • Workshop • One-on-One Intervention • Education Class	• TV Media Programs • Public Service Announcement • Web sites • Newsletters

• Group Discussion	

3. Description of targeted audience

Government /Agency Collaborators
All farm crop producers and farm helpers in the CNMI
Business operators that promote or sell farm products
Grade school, High School and College students
Adult Volunteer Leaders (4-H Clubs)

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	500	100	500
2009	100	500	100	500
2010	100	500	100	500
2011	100	500	100	500
2012	100	500	100	500

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	1	1
2009	1	1
2010	1	1
2011	1	1
2012	1	1

V(H). State Defined Outputs

1. Output Target

- Number of research projects completed on Soil and Water Quality Issues

2008 :1 **2009 :**1 **2010 :** 2 **2011 :**2 **2012 :**2

V(I). State Defined Outcome

1. Outcome Target

Number of households recycling aluminum cans or other recyclable commodities such as paper and plastic

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	15	20	20	20

3. Associated Knowledge Area(s)

- 403 - Waste Disposal, Recycling, and Reuse

1. Outcome Target

Number of households learning to safely use Rain-catchments systems

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
2	4	6	8	10

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

1. Outcome Target

Number of farmers using Dry Litter Waste Management Systems for Hogs

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
2	4	8	12	120

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

1. Outcome Target

Number of farmers or members of the community learning to compost animal wastes, yard scraps, etc…

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
15	20	30	40	50

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

1. Outcome Target

Number of farmers using Sustainable Agriculture techniques (best management practices) such as cover cropping, mulching, rotational grazing, no-till farming, composting, etc…

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
2	6	10	20	20

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 403 - Waste Disposal, Recycling, and Reuse

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Economy
- Natural Disasters (drought,weather extremes,etc.)

Description

Extreme economic downturn which might affect manpower availability; excessive turnover of technical staff involved in this program; and unavailability of needed facilities and equipment to conduct research.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)
- Before-After (before and after program)

Description

Best management practices utilizes or tested will be monitore before and after, and during the program for both control and treatment tests.

2. Data Collection Methods

- Tests
- On-Site
- Sampling
- Observation

Description

Farms, Farmers and people within the community will be questioned, observed and documented before and after having implemented the said technologies.

Soil and water will undergo laboratory tests under sampling method and be subjected for analysis depending on the objectives of the research.